

PROF. G.L.

Data on pathogenesis of lung cancer. Khirurgiia 34 no.3:66-71 Mr '58.  
(MIRA '58)

Iz 2-y kafedry klinicheskoy khirurgii (zav. - prof. B.K. Osipov)  
Tsentral'nogo instituta usovershenstvovaniya vrachey (dir. prof. V.P.  
Lebedev).

(LUNG NEOPLASMS, etiol. & pathogen.  
chronic inflamm. of lungs (Rus))

PEOFILOV, G.L.

Significance of bronchoscopy in the diagnosis of peripheral cancer  
of the lungs. Khirurgiia 34 no.8:130-131 Ag '58 (MIRA 11:9)

1. Iz 2-y kafedry klinicheskoy khirurgii (zav. - prof. B.K. Osipov)  
TSentral'nogo instituta usovershenstvovaniya vrachey (dir. - prof.  
V.P. Lebedeva).

(LUNG NEOPLASMS, diag.

peripheral, diag. value of bronchoscopy (Rus))

(BRONCHOSCOPY, in various dis.

cancer of lungs, peripheral (Rus))

FEOFILOV, G.L.

Surgeon's tactics in intense emphysema of the mediastinum. Nauch.  
rab. asp. i klin. ord. no.6:184-190 '60. (MIRA 14:12)

1. II kafedra klinicheskoy khirurgii (zav. prof. B.K.Osipov) Tsentral'-  
nogo instituta usovershenstvovaniya vrachey.  
(MEDIASTINUM--DISEASES) (EMPHYSEMA)

FEOFILOV, G.L.

Surgical treatment of mitral valve insufficiency; survey of the  
literature. Eksper.khir. 5 no. 3:42-50 My-Je '60. (MIRA 14:1)  
(MITRAL VALVE—SURGERY)

PEOPILOV, G.L.

Surgical technic in ectatic emphysemas of the mediastinum.  
Khirurgiia 36 no.1:27-30 Ja '60. (MIRA 13:10)  
(EMPHYSEMA)

FEOFILOV, G.L.

Evaluation of late results of the use of autotransplants in surgical  
repair of insufficiency of the mitral valve. Vop. pat. i reg. org.  
krov. i dykh. no.1:265-270 '61. (MIRA 18:7)

FEOFILOV, G.L. (Novosibirsk)

Bronchographic diagnosis of chronic bronchitis. Klin.med. no.12:  
69-72 '61. (MIRA 15:9)

1. Iz legochnogo otdeleniya (zav. - dotsent M.I. Perel'man)  
Instituta eksperimental'noy biologii i meditsiny (dir. -  
prof. Ye.N. Meshalkin) Sibirskogo otdeleniya AN SSSR.  
(BRONCHITIS) (BRONCHI—RADIOGRAPHY)

PROFILOV, G.I.; NOVIK, M.G.; ROVINA, A.K.; IVANOVA, S.V.

Bronchoscopic study under anesthesia using muscle relaxants.  
Sov.med. 25 no.1:93-99 Ja '62.

(MIRA 15:4)

1. Iz legochnogo (zav. - dotsent M.I.Perel'man) i anesteziologicheskogo otdeleniy (zav. Ye.I.Stadnikova) Instituta eksperimental'noy biologii i meditsiny sibirskogo otdeleniya AN SSSR (dir. - prof. Ye.N.Meshalkin).

(MUSCLE RELAXANTS) (BRONCHOSCOPY)  
(ANESTHESIA)



FEOFILOV, G.L.

Bronchoscopy through an intubation tube.. Khirurgiia 38 no.10:  
134-135 0 '62. (MIRA 15:12)

1. Iz legochnogo otdeleniya (zav. - dotsent M.I. Perel'man)  
Instituta eksperimental'noy biologii i meditsiny (dir. - prof.  
Ye.N. Meshalkin) Sibirskogo otdeleniya AN SSSR.  
(BRONCHOSCOPY)

FEOFILOV, G.L.; IVANOVA, S.V.

General anesthesia in bronchoscopy in children. *Pediatriia* 41  
no.9:62-65 S '62. (MIRA 15:12)

1. Iz legochnogo (zav. - dotsent M.I.Perel'man) i anesteziologicheskogo (zav. Ye.I.Stadnikova) otdeleniy Instituta eksperimental'noy biologii i meditsiny (dir. - prof. Ye.N.Meshalkin) Sibirskogo otdeleniya AN SSSR.  
(BRONCHOSCOPY) (PEDIATRIC ANESTHESIA)

FEOFILOV, G.L. (Novosibirsk, 72, mikrorayon "V", d.2, kv.4)

Complex bronchological examination in children. Vest. khir.  
91 no.8:89-94. Ag'63 (MIRA 17:3)

1. Iz legochnogo otdeleniya (zav. - dotsent M.I.Perel'man)  
Instituta eksperimental'noy biologii i meditsiny (dir. - prof.  
Ye.N. Meshalkin) Sibirskogo otdeleniya AN SSSR.

FEOFILOV, G.L.; PEREL'MAN, R.M.; KHRAMOVA, L.P.

Bronchological examination of children with chronic pulmonary tuberculosis. Probl. tub. 42 no.1:16-21 '64. (MIRA 17:8)

1. Institut eksperimental'noy biologii i meditsiny (dir. Yu.I. Borodin) Ministerstva zdravookhraneniya RSFSR i Novosibirskiy nauchno-issledovatel'skiy institut tuberkuleza (dir. M.V. S Svirezhev).

FEOFILOV, G.L. (Novosibirsk, mikrorayon "B", d.2, kv.4); MUKHIN, Ye.P.; IVANOVA, S.V.

Bronchography under anesthesia. Vest. khir. 92 no.1:68-69 Ja '64.  
(MIRA 17:11)

1. Iz 1<sup>o</sup> gochnogo otdeleniya (zav. - dotsent M.I. Perel'man) i otdeleniya anesteziologii (zav. - Ye.I. Stadnikova) Instituta eksperimental'noy biologii i meditsiny (dir.- prof. Ye.N. Meshalkin) Sibirskogo otdeleniya AN SSSR.

NOVIK, M.G. (Novosibirsk, Akademicheskaya ul., d.2-b, kv.2); ~~FEOFILOV, G.L.~~;  
SHERDUKALOVA, L.F.; AZBEL', D.I.

Clinical aspects of anesthesia in bronchial examinations. Vest. khir.  
92 no.3:116-121 Mr '64. (MIRA 17:12)

1. Iz anesteziologicheskogo otdeleniya (zav. - Ye.I.Stadnikova),  
legochnogo otdeleniya (zav. - dotsent M.I.Perel'man) i laboratorii  
klinicheskoy fiziologii (zav. - T.S.Vinogradova) Instituta eksperi-  
mental'noy biologii i meditsiny (dir. - prof. Ye.N.Meshalkin)  
Sibirskogo otdeleniya AN SSSR.

NEYMARK, I.I. (Barnaul); SHVIND, G.N. (Chelyabinsk); ZHUK, Ye.A.; KONOVALOV, Ye.D. (Novosibirsk); SAVEL'YEV, V.I.; LYADOV, Yu.S. (Yaroslavl'); KARAPETYAN, E.T. (Yerevan); FISHER, E.F. (Tomsk); TSINTSADZE, A.N. (Tbilisi); GOLOMAZOV, M.F. (Ternopol'); ELOZO, V.P. (Krasnodar); FEOFILOV, G.L.; MUKHIN, Ye.P. (Novosibirsk)

Abstracts. Grud. khir. 6 no.2:113-119 Mr.-Ap '64.

(MIRA 18:4)

PEREL'MAN, M.I.; FEOFILOV, G.I.

Some essential problems of bronchoscopy in childhood. Grud. khir.  
6 no.4:88-91 JI-Ag '64. (MIRA 18:4

1. Institut eksperimental'noy biologii i meditsiny Ministerstva  
zdravookhraneniya RSFSR, Novosibirsk. Adres Perel'mana: Moskva,  
B.Pirogovskaya, d.2/6, Institut eksperimental'noy i klinicheskoy  
khirurgii.



MESHALKIN, Ye.N.; SERGIYEVSKIY, V.S.; FEOFILOV, G.I.; SAVINSKIY, G.A.;  
BAYEVA, A.V.

First attempts at the surgical treatment of bronchial asthma by  
the autotransplantation of the lungs. Eksper. khir. i anest. 9  
no.6:26-33 N-D '64. (MIRA 18:7)

1. Institut eksperimental'noy biologii i meditsiny (nauchnyy  
rukovoditel' - prof. Ye.N.Meshalkin; direktor - dotsent Yu.I.  
Borodin) Ministerstva zdravookhraneniya RSFSR, Novosibirsk.

FEOPILOV, G.L.; MUKHIN, Ye.P.

New water-soluble contrast medium for bronchography. Vest. rent.  
i rad. 39 no.3:16-18. My-Je '64.

(MIRA 18:11)

1. Legochnoye otdeleniye (zav. - dotsent M.I.Peral'man)  
Instituta eksperimental'noy biologii i meditsiny Sibirskogo  
otdeleniya AN SSSR, Novosibirsk.

FEOFILOV, G.L.

Bronchial diverticulum. Khirurgiia no.10:143-145 '65.

(MIRA 18:8)

1. Legochnoye khirurgicheskoye otdeleniye (zav. - doktor med.nauk  
M.I.Perel'man) Instituta eksperimental'noy biologii i meditsiny  
(dir. - prof. Ye.N.Meshalkin) Sibirskogo otdeleniya AN SSSR,  
Novosibirsk.

FEDILCV, G.I.; ANTONOV, O.S.; BOGATINA, E.D.

Cinebronchography in diseases of the lungs. Sov.med. 28 no.4:96-98  
Ap '65. (MIRA 18:6)

1. Institut eksperimental'noy biologii i meditsiny (dir. - dotsent  
Yu.I.Borodin, nauchnyy rukovoditel' - prof. Ye.N.Meshalkin)  
Ministerstva zdравеоkhraneniya RSFSR, Novosibirsk.

FECFILOV, G.L.; SHAFER, E.S.; BOGATINA, E.D.

Structure of the bronchial tree in complete situs reversus  
viscerum. Vest. rent. 1 rad. 40 no.4:73 J1-Ag '65.

(MIRA 18:9)

1. Institut eksperimental'noy biologii i meditsiny (direktor -  
dotsent Yu.I. Borodin; nauchnyy rukovoditel' - prof. Ye.N.  
Meshalkin) Ministerstva zdravookhraneniya RSFSR, Novosibirsk.

FEOFILOV, L.G.

Prescalene lymph node biopsy in lung cancer [with summary in English].  
khirurgiya 33 no.8:38-42 Ag '57. (MIRA 11:4)

1. Iz 2-y kafedry klinicheskoy khirurgii (zav.-prof. B.K. Osipov)  
TSentral'nogo instituta usovershenstvovaniya vrachey (dir.-prof. V.P.  
Lebedeva)

(LUNG NEOPLASMS

biopsy of prescalene lymph nodes)

(BIOPSY

prescalene lymph nodes in cancer of lungs)

(LYMPH NODES

biopsy of prescalene lymph nodes in lung cancer)

FEOFILOV, N.G.; ARKHANGEL'SKIY, K.A.

Analysis of intercurrent diseases in a sanatorium. Vop. kur. fizioter.  
i lech. fiz. kul't, 25 no. 3:254-256 My-Je '60. (MIRA 14:4)

1. Iz Kislovodskogo sanatoriya Ministerstva oborony Soyuz SSR.  
(KISLOVODSK—SANATORIUMS) (RESPIRATORY ORGANS—DISEASES)

AUTHORS: Komaishko, G.S., Matviyenko, V. I., SOV/89-5-1-6/28  
Permyakov, V. M., Subbotin, Ye. S., Feofilov, O.G.

TITLE: On Some Methods Employed for the Mass Production of Po- $\alpha$ -Be Neutron Sources (O nekotorykh metodakh massovogo izgotovleniya Po- $\alpha$ -Be neytronnykh istochnikov)

PERIODICAL: Atomnaya energiya, 1958, Vol. 5, Nr 1, pp. 64-67 (USSR)

ABSTRACT: For the production of Po- $\alpha$ -Be neutron sources one of the wet methods is, above all, described. This method consists in the production of a uniform mixture of polonium and beryllium by causing a polonium solution combined with nitric acid to act upon beryllium powder. The mixture obtained is dried and pulverized. A method is described by means of which it is possible to obtain nitric acid polonium free from a copper carrier. In view of its high degree of neutron activity existing during the entire technical production process, the method described is, however, unsuited for the mass production of the preparation concerned. For mass production a method developed by Brean, Hertz, which was improved by the authors, is very well suited. Copper powder

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On Some Methods Employed for the Mass Production  
of Po- $\alpha$ -Be Neutron Sources

SOV/89-5-1-6/28

containing a known quantity of polonium 210 is weighed into a container, which is then filled with beryllium powder. During the following heating of the hermetically closed container the polonium is sublimated, after which it is uniformly distributed in the mixture. By employing this method it is possible, without any danger to the operating staff, to produce neutron preparations up to  $2,1 \pm 0,2 \times 10^6$  n/sec from 1 C polonium 210. There are 2 figures and 7 references, 1 of which is Soviet.

SUBMITTED: June 17, 1957

1. Neutrons--Sources
2. Mixtures--Preparation
3. Polonium  
--Properties
4. Copper powder--Properties
5. Beryllium powder  
--Properties

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S/051/62/012/001/020/020  
E032/E514

AUTHORS: Antonov-Romanovskiy, V. and Feofilov, P.

TITLE: 10th conference on luminescence

PERIODICAL: Optika i spektroskopiya, v.12, no.1, 1962, 151-154

TEXT: The conference took place on June 26-July 1, 1961 in Moscow. It was dedicated to the memory of

Academician S. I. Vavilov who was the founder of the Soviet luminescence school. Most of the papers read at the conference were concerned with the review and generalization of the work published in the ten years since the death of S. I. Vavilov. Problems in molecular luminescence and in the luminescence of crystal phosphors were discussed. The conference was attended by 350 delegates representing 180 organizations from many towns in the Soviet Union. The conference was opened by V.L.Levshin who reviewed the scientific activity of S. I. Vavilov and the main successes of the Soviet luminescence school during the last ten years. A. N. Sevchenko and A. A. Shishlovskiy reviewed the life and activity of S. I. Vavilov. Among the papers read at the conference were the following: ✓

P. A. Cherenkov "The emission of radiation by particles moving  
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10th conference on luminescence S/051/62/012/001/020/020  
E032/E514

with velocities greater than the velocity of light and its application in the physics of high energy particles".

B. I. Stepanov: present state of the theory of luminescence of complex molecules.

B. Ya. Sveshnikov spoke on the present state of the theory of quenching of luminescence.

M. D. Galanin reported some new results obtained by M.N. Alentsev and L. A. Pakhomychева on the anti-Stokes decrease in the yield of fluorescein solutions. ✓

E. V. Shpol'skiy reviewed new results of studies of line absorption and luminescence spectra of organic substances.

B. S. Neporent reported on the effect of van der Waals forces on the effectiveness of energy transfer in collisions between complex molecules and other molecules.

V. V. Zelinskiy reported examples of correlation between the position of the fluorescent spectrum maximum on the one hand, and the fluorescence yield, the ratio of phosphorescence and fluorescence yields and susceptibility to quenching action on the other hand.

A. S. Cherkasov reported experimental facts indicating the  
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10th conference on luminescence

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presence of reorientation of solute molecules near excited molecules of some derivatives of anthracene and phthalimide.

A. N. Sevchenko: "Spectro-luminescence studies of dyes belonging to the porphin series".

M. D. Galanin gave a review paper concerned with the yield and long-wavelength radio luminescence of organic substances.

A. N. Terenin and V. L. Yermolayev reviewed work concerned with the sensitized fluorescence which was discovered by them in 1952.

V. L. Levshin: "Energy migration in solutions and the associative theory of luminescence quenching.

A. F. Prihot'ko: "Excitons in crystals and their effect on spectra"

A. N. Zaydel spoke on the luminescence of salts of gadolinium in crystals and solutions.

P. P. Feofilov was concerned with the line luminescence of activated inorganic crystals. ✓

A. A. Kaplyanskiy was concerned with the piezo-spectroscopic effect in ruby and its application to the generation of coherent radiation.

N. G. Basov was concerned with lasers.

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10th conference on luminescence

S/051/62/012/001/020/020  
E032/E514

V. A. Fabrikant: "On Bouguer's law".

Ch.B. Lushchik, N. Ye. Lushchik and I. V. Yaek discussed electron-vibrational processes in solutions of complex molecules in connection with the properties of crystal phosphors.

F. D. Klement: "Structure and spectra of alkali-ammonium-halide crystal phosphors".

I. A. Parfianovich and Ye. I. Shuraleva spoke on the relation between luminescence and lattice micro-defects.

M. L. Kats was concerned with new data on the absorption and luminescence of activator capture centres in alkali-halide phosphors activated with Ni, Ag and Cu.

M.U. Belyy, I. S. Gorban' and A. A. Shishlovskiy: "Photoluminescence of halide salts of heavy metals and semiconducting crystals.

V. L. Levshin: "Accumulation and transport of excitation energy in crystal phosphors".

B. M. Nosenko reported some results on the exoelectronic emission.

V. A. Sokolov and A. N. Gorban' discussed the candoluminescence of crystal phosphors.

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10th conference on luminescence

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M. V. Fok: "Properties of emission excited by electric fields".

A. M. Bonch-Bruyevich reported studies of the electroluminescence of zinc-sulphide phosphors under pulsed excitation.

F. I. Vergunas: "Photo dielectric effect in electroluminescent zinc-sulphide phosphors"

V. V. Antonov-Romanovskiy discussed the possible applications of the electron paramagnetic resonance method to the study of phosphors.

M. A. Konstantinova-Shlezinger: "Dependence of the luminescence properties of phosphors on their crystal and physico-chemical nature.

A. A. Bundel<sup>o</sup> suggested that the luminescence centres of compounds of elements belonging to groups II-VI appear during the process of thermal dissociation of the main substance or the activator compounds. ✓

R. A. Nilender: "Work at the Moskovskiy elektrolampovyy zavod (Moscow Electric Lamp Factory) on luminescence lamps".

R. A. Nilender, V. A. Fabrikant reported measurements by

F. A. Butayeva who determined the luminescence yield of lamp

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10th conference on luminescence

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E032/E514

phosphors and found that the quantum yield of halophosphate excited by  $\lambda 1850 \text{ \AA}$  is greater than 1.

L. A. Tumerman discussed the possible applications of luminescence to biological processes.

M. N. Meysel: "Luminescence cyto- and histo-chemistry".

A number of other papers were concerned with application of luminescence in chemistry and biology. A. V. Karyaki reported on the experimental study of the possible use of luminescence in the diagnosis of carcinoma. ✓

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PHOFILOV, P.D.

Excision of radial neurinoma. Vop. neirokhir. 18 no.5:52-53  
S-O '54. (MIRA 7:11)

1. Iz khirurgicheskogo otdeleniya Polikliniki No. 1 TSentral'nogo  
voyennogo krasnoznamennogo gositalya imeni P.V.Mandryka.

(NEURILEMMOMA

radial nerve, surg.)

(NERVES, RADIAL, neoplasms,

neurilemmoma, surg.)



FEOFILOV, P. D.

"Some Errors of a Polyclinic Surgeon in Diagnosing Acute Surgical Stomach Ailments," Voenno-Med. Zhur., No. 6, p. 82, 1955.

YURKEVICH, I.D.; FEOFILOV, V.A.

Durmast oak (*Quercus petrae* Liebl) growing in the Bialowieza  
Forest. Sbor. bot. rab. Bel. otd. VBO no.2:229-234 '60.  
(MIRA 15:1)

(Bialowieza Forest.—Oak)

ARAIPOVA, E.Ya.; BARANOVA, Ye.G.; LEVSHIN, V.L.; TIMOFEYeva, T.V.; TROFIMOV,  
A.K.; TROFILOV, P.P.

Luminescent method of quantitative determination of gadolinium in  
metallic beryllium. Trudy Kom. anal. khim. 12:344-354 '60.  
(MIRA 13:8)

(Beryllium--Analysis)

(Gadolinium earths)

80551

S/051/60/008/05/012/024  
R201/R691

5.2500

AUTHOR: Peofilev, P.P.

TITLE: On the Nature of Elementary Oscillators of the Uranium Ion

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 6, pp 824-827 (USSR)

ABSTRACT: The nature of the elementary oscillators of the hexavalent uranium ion was investigated using the luminescence polarization method (Ref 4) used earlier for activated cubic crystals (Ref 5). The bright green luminescence of LiF-U was employed (LiF-U crystals were prepared by L.M. Belyayev and his fellow workers). Cooling of these crystals to the liquid-air temperature showed the line structure of the spectrum and this made it possible to determine the sign and the degree of polarization of individual lines. Samples of LiF-U were in the form of parallelepipeds cut from larger crystals along the (100) cleavage planes. Observations were carried out at right angles to the exciting beam produced by a mercury lamp SVDSH-250 ( $\lambda = 405, 365$  and  $313 \text{ m}\mu$ ). The exciting light was polarized by means of a Glan prism. The observation channel consisted of a slit, an Iceland spar crystal and a diffraction-grating spectrograph with  $6.5 \text{ \AA/mm}$  dispersion. The spectra were

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E201/E691

On the Nature of Elementary Oscillators of the Uranium Ion

photographed for two positions of the plane of polarization of the exciting light:  $\eta = 0$  and  $\eta = \pi/2$ . The luminescence spectrum consisted of two groups of lines: at 490-520 and 520-560 mμ. The 405 mμ line excited only the long-wavelength group of luminescence lines which were strongly polarized (magnitude and sign of polarization varied from line to line). When the 365 mμ line was used to excite the crystal both luminescence groups were observed but clear polarization could be seen only in the short-wavelength group (Fig 2). The 313 mμ line produced luminescence which was not polarized. Comparison of the experimental data with the theoretical scheme given in Fig 1 showed that the 365 mμ light was absorbed by circular electric oscillators  $\sigma_e$ . The oscillators emitting luminescence were also circular (Table 1) but some of them were electric ( $\sigma_e$ ) and some magnetic ( $\sigma_m$ ). All the long-wavelength luminescent lines (520-560 mμ) could be regarded as due to either combinations of  $\sigma_e \rightarrow \pi_e$  and  $\sigma_e \rightarrow \sigma_m$ , or due to combinations of  $\pi_e \rightarrow \sigma_e$  and  $\pi_e \rightarrow \sigma_m$  (Table 2). These combinations were indistinguishable within the framework of the luminescence polarization method. Acknowledgments are made to O.V. Sokolova for her help in experiments. There are 2 figures, 2 tables and 7 Soviet references.

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SUBMITTED

November 10, 1959

S/051/61/010/001/017/017  
E201/E491

AUTHOR: Feofilov, P.P.

TITLE: The Spectra and Kinetics of Luminescence of  $\text{CaF}_2:\text{Tb}$

PERIODICAL: Optika i spektroskopiya, 1961, Vol.10, No.1, pp.142-144

TEXT: Two similar sequences of line groups, displaced with respect to one another by  $5800 \text{ cm}^{-1}$ , were found in  $\text{CaF}_2:\text{Tb}$  (Ref.1). They lay at 380 - 480 mμ and 490 - 660 mμ (Fig.1a). Fig.1b shows details of the second sequence. The positions (frequencies of the "centres of gravity" of bands) of the various band groups in the two sequences are listed in a table on p.143. It is shown that the two sequences are due to transitions from two excited states of  $\text{Tb}^{3+}$  to the ground state (Fig.2). There are 2 figures, 1 table and 6 references: 4 Soviet and 2 non-Soviet.

SUBMITTED: July 25, 1960

Card 1/1

FEKFILOV, P.P.

S.I.Vavilov, creator of the Soviet school of luminescence. Usp.  
fiz.nauk 75 no.2:277-286 0 '61. (MIRA 14:10)  
(Vavilov, Sergei Ivanovich, 1891-) (Luminescence)

20815

S/048/61/025/003/003/047  
B104/B201

9.6150  
24.3520 (1137, 1138, 1395)

AUTHORS: Vasil'yeva, M.A., Kuprevich, V.V., Stepanov, I.V.  
(Deceased), and Feofilov, P.P.

TITLE: Single-crystal cathodoluminescence screens

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya,  
v. 25, no. 3, 1961, 321 - 323

TEXT: This is a reproduction of a lecture delivered at the 9th Conference on Luminescence (Crystal Phosphors), which took place in Kiyev from June 20 to 25, 1960. The authors developed and studied single-crystal cathodoluminescence screens, prepared from fluorite ( $\text{CaF}_2$ ), fluorostrotrontium and fluorobarium, and activated with uranium and various rare earths (Sm, Eu, Tb, Dy, Ho, Er, Tu). The single crystals were bred in accordance with Bridgman and a method proposed by I.V. Stepanov. The activator was deposited in the form of a first layer of  $\text{UO}_2\text{F}_2$  or fluorides of the rare earths. X

The green luminescence of uranium-activated screens could be excited by an electron beam or by ultraviolet light. The color of screens activated with

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B104/B201

Single-crystal cathodoluminescence ...

rare earths changed somewhat on the passage from fluorides to fluorostrontium or fluorobarium, and a variation of the rare earths gave rise to various colors of the luminescence. The spectra of cathodoluminescence of the screens were found to be practically identical with the spectra of photoluminescence. The single crystals of the fluorides of alkali-earth metals possess a low surface conductivity, and therefore the screens were provided with silver or aluminum films at the excitation side to prevent them from being charged electrically. As an example, results concerning the  $\text{CaF}_2$ -Eu screen are graphically illustrated in Figs. 1 and 2. Fig. 1 shows the light yield of the cathodoluminescence of this screen as a function of the activator concentration at electron excitation (11 kv,  $j = 10^{-7} \text{ a/cm}^2$ ). Fig. 2 shows for two screens the resolution  $\mu$  as a function of the electron energy at a current density of  $j = 10^{-8} \text{ a/cm}^2$ . The temperature extinction of luminescence and the duration of the afterglow were determined under ultraviolet light. Apart from the  $\text{CaF}_2$ -Eu screen, where a temperature extinction was observable at  $50^\circ\text{C}$ , no extinction was observed in any of the other screens up to  $200^\circ\text{C}$ . The afterglow in Eu-activated screens lasted  $10^{-7}$  seconds, and  $10^{-4}$  seconds in uranium-activated ones, X

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S/048/61/025/003/003/047  
B104/B201

Single-crystal cathodoluminescence ...

while these times ranged between  $10^{-2}$  and  $10^{-3}$  seconds with the other screens. When rigorous breeding conditions were observed, screens under the action of electron rays with current densities of  $10^{-7}$  -  $10^{-8}$  a/cm<sup>2</sup> conserved the brightness of luminescence for dozens of hours. The screens described are very stable against atmospheric actions and temperature fluctuations. There are 2 figures and 6 references: 4 Soviet-bloc and 2 non-Soviet-bloc. The 2 references to English language publications read as follows: Bridgman P.W., Proc.Amer. Acad.Sci., 60, 306, (1925), Stockbarger D. J., Opt. Soc. America, 39, 731, 1949

Card 3/43

S/048/61/025/004/045/048  
B117/B209

24.3500

AUTHORS: Belyayev, L. M., Dobrzanskiy, G. F., and Feofilov, P. P.

TITLE: Luminescence of uranium-activated lithium- and sodium fluoride single crystals

PERIODICAL: vestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 4, 1961, 548-556

TEXT: The present paper was read at the 9th Conference on Luminescence (Crystal Phosphors) and contains data on the luminescent properties of uranium-activated lithium- and sodium fluoride single crystals. The single crystals were grown from a melt according to a method by Kyropoulos. The activator in the form of uranyl nitrate was added in concentrations of 0.01 to 0.3%. In the visible range of the absorption spectra of the crystals concerned, weak bands with a clear structure as well as a strong absorption in the ultraviolet range with several blurred maxima can be observed at room temperature. When temperature is lowered to that of liquid nitrogen, the long-wave bands are split up into a large number of very narrow lines. The luminescence of LiF-U and of NaF-U single crystals

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22196

Luminescence of uranium-activated ...

S/G48/61/025/004/045/048  
B117/B209

may be excited in the long-wave region of the absorption bands as well as in the ultraviolet region. The structural character of the luminescence spectra is clearly distinct already at room temperature. Cooling gives rise to many lines the width of which in many cases is only fractions of an angstrom. Many of the lines can be counted as resonance lines since they occur in the luminescence- as well as in the absorption spectra. The only law which so far has been found in low-temperature luminescence spectra is the existence of equidistant series which contain particularly bright lines that have been always observed in all samples. In general, the luminescence of LiF-U and NaF-U single crystals excited by linearly polarized light is partly polarized. The degree of polarization clearly depends on the mutual position of the crystallographic axes of the sample and on the electric vector of the exciting light (azimuthal dependence), on the wavelength of the exciting light (polarization spectrum), and on the wavelength in the luminescence spectrum. In the study of the azimuthal dependence (provisional results for LiF-U are found in Ref. 5: P. P. Feofilov, Optika i spektroskopiya, 7, 842 (1959)) the authors found an orientation of the luminescence centers along the fourth-order symmetry axis. The curves taken for the

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S/048/61/025/004/045/048  
B117/B209

Luminescence of uranium-activated ...

dependence of the degree of polarization on the wavelength in the luminescence spectrum showed a characteristic, though not quite understandable shape. (The authors thank P. I. Kudryashev for the device by means of which the curves were taken). This shape can hardly be the object of a serious discussion since it is the rather complex result of superimposition of elementary radiations, which are clearly manifest in the investigation of cooled crystals. The polarization spectra of the crystals examined resemble essentially the polarization spectra of most of the dyes. The presence of highly polarized lines in the luminescence spectra of the crystals concerned permits employing the method of the luminescence polarization diagrams which has been suggested by S. I. Vavilov (Ref. 11: Zh. eksperim. i teor. fiz., 10, 1363 (1940) and Sobr. soch. 2, 58, 1952). With the help of this method, the nature (multipole order) of elementary oscillators can be clearly determined in most cases. The results of the determination of the multipole order are compiled in the table, showing that the long-wave section of the luminescence spectrum is formed by linear oscillators. The group of short-wave lines in the LiF-U spectrum is described by circular oscillators  $\sigma_e$  and  $\sigma_m$ . The results of these

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Luminescence of uranium-activated ...

22196

S/048/61/025/004/045/048  
B117/B209

studies show that the luminescence of hexavalent uranium ions is to be regarded as a superposition of forced electric and magnetic dipole radiations. It was found that one of the two principal electron vibration series observed in the spectra of the crystals concerned is formed by electric, the other by magnetic emitting dipoles. The sub-series in the NaF-U spectrum are also formed by one kind of emitters, viz., either by electric or by magnetic ones. In this way, the level schemes shown in Fig. 9 can be set up. They describe the principal lines in the relatively long-wave section of the spectrum of these crystals, which begins with the resonance lines of the longest wavelength. I. P. Shapiro is mentioned. There are 9 figures, 1 table, and 16 references: 13 Soviet-bloc and 3 non-Soviet-bloc.

Card 4/64

FEOFILOV, P. P.

FRISH, S.E., otv. red.; BOBOVICH, Ya.S., kand. fiz.-matem. nauk, red.;  
VOL'KENSHTEYN, M.V., doktor fiz.-matem. nauk, red.; GALANIN,  
M.D., doktor fiz.-matem. nauk, red.; DRUKAREV, G.F., doktor  
fiz.-matem. nauk, red.; YEL'YASHEVICH, M.A., akademik, red.;  
KALITEYEVSKIY, N.I., doktor fiz.-matem. nauk, red.; KUSAKOV,  
M.M., doktor khim. nauk, red.; LIPIS, L.V., doktor tekhn.nauk,  
red.; PEKAR, S.I., doktor fiz.-matem. nauk, red.; PROKOF'YEV,  
V.K., doktor fiz.-matem. nauk, red.; SOKOLOV, N.D., doktor  
fiz.-matem. nauk, red.; FEOFILOV, P.P., doktor fiz.-matem.  
nauk, red.; CHULANOVSKIY, V.M., doktor fiz.-matem. nauk, red.;  
SHPOL'SKIY, E.V., doktor fiz.-matem. nauk, red.; YAROSLAVSKIY,  
N.G., kand. fiz.-matem. nauk, red.; LEKSINA, I.Ye., red. izd-  
va; PENKINA, N.V., red. izd-va; NOVICHKOVA, N.D., tekhn. red.;  
KASHINA, P.S., tekhn. red.

[Physical problems in spectroscopy] Fizicheskie problemy spektro-  
skopii; materialy. Moskva, Izd-vo Akad. nauk SSSR. Vol.1. 1962.  
474 p. (MIRA 16:2)

1. Soveshchaniye po spektroskopii. 13th, Leningrad, 1960. 2. Chlen-  
korrespondent Akademii nauk SSSR (for Frish). 3. Akademiya nauk  
Belurusskoy SSR (for Yel'yashevich).  
(Spectrum analysis)

BR

ACCESSION NR: AR4032172

S/0058/64/000/002/D035/D036

SOURCE: Ref. zh. Fiz., Abs. 2D267

AUTHORS: Feofilov, P. P.; Kaplyanskiy, A. A.

TITLE: Latent optical anisotropy of cubic crystals containing local centers, and methods of its investigation (topics of a paper)

CITED SOURCE: Sb. Fiz. shchelochnogaloidn. kristallov. Riga, 1962, 100-101

TOPIC TAGS: latent anisotropy, cubic crystal, local center, anisotropic center, optical property, photochemical process, anisotropic photochemical process, spectral band splitting

TRANSLATION: Topics of a paper. The following questions are considered: concept of latent anisotropy of cubic crystals with local centers; classification of anisotropic centers; optical properties

Card 1/2



ACCESSION NR: AR4032172

of individual centers; optical properties of individual center; general principle of investigation of centers -- study of the optical properties of the crystal under the influence of anisotropic external action; anisotropic photochemical processes in crystals with centers; polarized luminescence of cubic crystals; splitting of spectral bands under elastic oriented strains and in magnetic and electric fields; paramagnetic resonance of centers. The discussions following the paper are reported. A. K.

DATE ACQ: 31Mar64

SUB CODE: PH

ENCL: 00

Card 2/2

FEOFILOV, P.P.; KAPLYANSKIY, A.A.

Spectra of bivalent rare earth ions in crystals of alkali metal  
fluorides. Part 1. Samarium. Opt. i spektr. 7 no.4:493-500  
Ap '62. (MIRA 15:5)  
(Alkali metal fluorides—Spectra) (Samarium—Spectra)

FEOPILOV, P.P.

Phototransfer of electrons in  $\text{MeF}_2$ -Eu, Sm single crystals. Opt.  
i spektr. 7 no.4:531-533 Ap '62. (MIRA 15:5)  
(Alkali metal fluoride crystals) (Photoelectricity)

S/051/G2/015/002/006/014  
E202/E492

AUTHORS: Kaplyanskiy, A.A., Feofilov, P.P.

TITLE: Spectra of bivalent ions of rare earths in crystals  
of alkaline earth fluorides. II. Europium and Ytterbium

PERIODICAL: Optika i spektroskopiya, v.13, no.2, 1962, 235-241

TEXT: Absorption and luminescence spectra of  $\text{Eu}^{2+}$  and  $\text{Yb}^{2+}$  introduced separately into single crystal fluorides of Ca, Sr and Ba were studied at 293, 77 and 4.2°K. The absorption spectra of the above  $\text{MeF}_2\text{-Eu}^{2+}$  were almost wholly contained in the UV region, and all had two strong and broad bands: the longwave and asymmetric (I) which was displaced towards the shortwave region with the increasing Me cation radius, and shortwave (II) displaced in the opposite direction. The luminescence spectra of  $\text{MeF}_2\text{-Eu}^{2+}$  crystals showed at 77°K bright blue luminescence with a number of well defined bands corresponding to region (I). The absorption spectra of  $\text{MeF}_2\text{-Yb}^{2+}$  showed similar bands to (I) and (II) and, in addition, most of the samples had also two local peaks on the long wavelength slope of (II).  $\text{CaF}_2\text{-Yb}^{2+}$  showed at low temperatures unusually strong and comparatively persistent yellow-Card 1/2

S/051/62/013/002/006/014  
E202/E492

Spectra of bivalent ions ...

green luminescence which was structureless even at 4.2°K. No luminescence was detected with the corresponding Sr and Ba fluorides. Comparing the present results with those obtained for trivalent rare earths ions the authors commented as follows:

1) there is a greater transition probability for the bivalent ions; 2) the persistence of the excited states in the bivalent ions is shorter approximately by the order of 3; 3) also the shift of the energy levels due to change of Me is higher by the order of 1.5 to 2 than that of trivalent ions; 4) bivalent ions are much more subjected to temperature quenching; 5) clearly discernible electron-oscillation series are present in the absorption spectra. It was concluded that there are strong interactions of the excited states of the bivalent traces with the lattice which implies that the explanation of the observed phenomena cannot be fully explained by the transitions within the  $4f^k$  configurations but are very likely due to transitions between the fundamental state and the terms of the mixed configurations, particularly  $4f^{k-1}5d$ . There are 6 figures and 2 tables.

SUBMITTED: September 27, 1961

Card 2/2

S/051/62/013/002/014/014  
E202/E492

AUTHORS: Feofilov, P.P., Tolstoy, M.N.

TITLE: Luminescence kinetics of divalent samarium in single crystals of strontium and barium fluorides

PERIODICAL: Optika i spektroskopiya, v.13, no.2, 1962, 294-296

TEXT: The object of this work was to confirm the results of earlier work (Opt. i spektroskopiya, v.12, 1962, 493) and in particular to give detailed quantitative data on the luminescence kinetics of the  $\text{Sm}^{2+}$  ions in the single crystals of  $\text{SrF}_2$  and  $\text{BaF}_2$  and the explanation of the interaction of 5d and 4f configurations. An impulse taumeter designed by Tolstoy was used to find the relations between the duration of luminescence and the radiated wavelength. Luminescence was excited with the help of an impulse light modulator giving 10 impulses per sec. It was found that the thermal equilibrium between the states of the  $4f^5 5d$  configuration and the  $5D_0$  level of the  $4f^6$  configuration was established within a time considerably shorter than the average duration of the excited state and hence the aggregate of the excited levels could be considered as a single system. From  
Card 1/2

Luminescence kinetics ...

S/051/62/013/002/014/014  
E202/E492

their premises the authors developed an approximate equation describing the kinetics of the deactivation of the excited state the solution of which gave the exponential kinetic of luminescence. It was concluded that the above type of luminescence occurs during the transitions from two excited energy systems which are in mutual thermal equilibrium. Irrespective of the existing differences in the population of these systems, the intensities of their radiation within the determined temperature interval were comparable as a result of sharp differences in the probabilities of the radiative transitions. The sharp fall in the intensity of luminescence from the  $^5D_0$  levels with temperature was explained by the shift of the electrons from the  $^5D_0$  levels to the levels of the  $4f^5 5d$  configuration. There are 2 figures.

SUBMITTED: March 6, 1962

Card 2/2

S/048/62/026/004/001/014  
B104/B102AUTHOR: Feofilov, P. P.TITLE: Line luminescence of active crystals (rare-earth ions in  $\text{MFe}_2$  single crystals)

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 4, 1962, 435 - 449

TEXT: This review article is based chiefly on papers published by the author in the years 1954 - 61. The main characteristics of a series of single crystals containing activators with line spectra are discussed. It is concluded that active centers possess multiplicity, and various types of centers are related to the conditions of synthesis. Valuable information on the structure of centers with line spectra can be obtained from spectroscopic investigations in connection with perturbations (magnetic field, uniform deformation). The shift of line spectra in homologous series of luminophors can be taken as a measure of the perturbation of an ion by innercrystalline fields and for the screening action of the electron shell of the activator. Precise data on absorption spectra

Card 1/2



Line luminescence of active...

S/048/62/026/004/001/014  
B104/B102

can be obtained with the aid of monocrystalline luminophors and polarization techniques. There are 10 figures and 4 tables.

Card 2/2

S/053/62/076/002/001/004  
B117/B104

AUTHORS: Feofilov, P. P., and Kaplyanskiy, A. A.

TITLE: The latent optical anisotropy of cubic crystals with local centers and methods for their investigation

PERIODICAL: Uspekhi fizicheskikh nauk, v. 76, no. 2, 1962, 201 - 238

TEXT: This is a survey on latent optical anisotropy of cubic crystals, due to the presence of particularly shaped local defects in cubic lattice. The paper bases on a lecture held at II Soveshchaniye po fiziki shchelochno-galodnykh kristallov (2nd Conference on Alkali Halide Crystals) in Riga, June, 1961. Other papers on characteristic optical phenomena due to the presence of these so-called anisotropic centers are discussed: photo-chemical processes in cubic crystals with anisotropic centers; polarized luminescence of cubic crystals; splitting of spectral lines of cubic crystals under the action of directed elastic deformations (piezo-spectroscopic phenomenon) and under the action of magnetic and electric fields (Zeeman effect, Stark effect). V. L. Vinetskiy, M. F. Deygen, P. A. Khellenurme, O. A. Shmit, L. K. Yanson, A. A. Shatalov, L. I. Tarasova,

Card 1/2

The latent optical anisotropy...

S/053/62/076/002/001/004  
B117/B104

N. Ye. Lushchik, L. A. Alekseyeva, Yu. R. Zakis, S. I. Vavilov, V. A. Arkhangel'skiy are mentioned. There are 23 figures, 1 table, and 88 references: 39 Soviet and 49 non-Soviet. The four most recent references to English-language publications read as follows: E. Sonder, Bull. Amer. Phys. Soc. 6, 114 (1961); J. Corbett, G. Watkins, J. Chem. Phys. Sol. 20, 319 (1961); D. J. Faraday, H. Rabin, W. D. Compton, Phys. Rev. Lett. 7, 17 (1961); C. Delbecq, W. Hayes, P. Yuster, Phys. Rev. 121, 1043 (1961). ✓

Card 2/2

T. D. A. C.

S/051/62/012/004/004/015  
E039/E485

AUTHORS: Feofilov, P.P., Kaplyanskiy, A.A.

TITLE: Spectra of divalent rare earth ions in crystals of alkaline-earth fluorides. I. Samarium

PERIODICAL: Optika i spektroskopiya, v.12, no.4, 1962, 493-500

TEXT: The spectro-luminescent character of the system  $\text{MeF}_2 - \text{TR}^{2+}$  ( $\text{Me} = \text{Ca, Sr, Ba}$ ;  $\text{TR} = \text{Sm, Eu, Yb}$ ) is studied at room temperature, 77 and 4.2°K. Data referring to the  $\text{Sm}^{2+}$  ion are given in this paper. The luminescent and absorption spectra of the divalent ions of samarium in single crystal fluorides of Ca, Sr and Ba are obtained. The absorption spectra show a general similarity possessing three well defined bands. The luminescent spectra of  $\text{SrF}_2 - \text{Sm}^{2+}$  and  $\text{BaF}_2 - \text{Sm}^{2+}$  are similar in character, with little relative displacement ( $\approx 20 \text{ cm}^{-1}$ ) between them. The luminescent spectrum of  $\text{CaF}_2 - \text{Sm}^{2+}$  is different from the others. A series of absorption and radiated lines from  $\text{MeF}_2 - \text{Sm}^{2+}$  disappear when the crystals are cooled at 77 and 4.2°K. An energy level diagram is constructed for the  $\text{MeF}_2 - \text{Sm}^{2+}$  system. Two types of excitation level are shown, Card 1/2

Spectra of divalent rare earth ...

S/051/62/012/004/004/015  
E039/E485

a strong and a weak, which are different for the various cation bases. The displacement of the strong levels is similar to that observed in the band structure of the absorption spectra. Other characteristics of the spectra are explained on the basis of this energy level diagram, including the "freezing out" of lines at the lower temperatures. It is shown that the absorption spectra of all the radiated crystals and the radiated spectrum of  $\text{CaF}_2 - \text{Sm}^{2+}$  are produced by the transition of electrons from the 4f shell to the outer shells (5d, 6s, etc). There are 7 figures and 2 tables. ✓

SUBMITTED: September 27, 1961

Card 2/2

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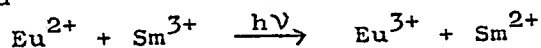
S/051/62/012/004/014/015  
EO39/E485

AUTHOR: Feofilov, P.P.

TITLE: The phototransfer of electrons in  $\text{MeF}_2\text{-Eu}$ , Sm single crystals

PERIODICAL: Optika i spektroskopiya, v.12, no.4, 1962, 531-533

TEXT: It is shown that when two rare earth metals are present simultaneously as activators in single crystals of the fluorides of the alkaline-earth metals, there is a change of valency which can be interpreted as phototransfer between the rare earth ions. These changes are detected by observing the absorption spectra of the crystals. Crystals of barium, calcium and strontium fluorides were grown containing the two rare earth elements Sm and Eu. When exposed to light from a condenser spark or mercury lamp (also  $\gamma$  rays) they acquire colour characteristic of the  $\text{Sm}^{2+}$  ion. Absorption spectra are shown for  $\text{BaF}_2\text{-Eu}$ , Sm before and after exposure which indicate that the following process has occurred

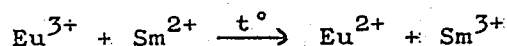


Card 1/2

The phototransfer ...

S/051/62/012/004/014/015  
E039/E485

i.e. a phototransition of electrons from Eu to Sm. Observations of the absorption bands 235 (Eu<sup>2+</sup>) and 572 (Sm<sup>2+</sup>) mmk during exposure of BaF<sub>2</sub>-Sm, Eu to light from an iron arc show a decrease in the intensity of the 235 mmk band and a simultaneous increase in the 572 mmk band as the exposure continues. This is a metastable condition. At room temperature the exposed crystal has a colour characteristic of Sm<sup>2+</sup> but if heated to 400 - 600°C it becomes colourless and the spectrum characteristic of Eu<sup>2+</sup> reappears; hence the following process must occur:



The mechanism of these processes is discussed and it is shown that the optical method of observing ionization effects has considerable advantage over electron paramagnetic resonance. There are 2 figures.

SUBMITTED: October 19, 1961

Card 2/2

KARISS, Ya.E.; FEOFILOV, P.P.

Absorption spectra, luminescence, and stimulated radiation of  
neodymium in  $\text{SrF}_2$  crystals. Opt. i spektr. 14 no.1:169-172

Ja '63.

(MIRA 16:5)

(Masers)

(Neodymium)

(Strontium fluoride crystals)



FRISH, S.E., otv. red.; FEOFILOV, P.P., red.; SAZONOV, L.S., red.;  
ZENDEL', R.Ye., tekhn. red.

[Optics and spectroscopy] Optika i spektroskopiia; sbornik  
statei. Moskva, Izd-vo Akad. nauk SSSR. Vol.1. [Luminescence]  
Luminestsentsiia. 1963. 364 p. Vol.2. [Molecular spectro-  
scopy] Molekuliarnaia spektroskopiia. 1963. 346 p.

(MIRA 16:4)

1. Akademiya nauk SSSR. Otdeleniye fiziko-matematicheskikh  
nauk. 2. Chlen-korrespondent Akademii nauk SSSR (for Frish).  
(Luminescence) (Molecular spectra)

KARAPETYAN, V.Ye.; MAKSAKOV, B.I.; FEOFILOV, P.P.

Absorption and luminescence of divalent samarium in alkali halide single  
crystals. Opt. i spektr. 14 no.3:441-443 Mr '63. (MIRA 16:4)  
(Alkali metal halide crystals--Growth) (Samarium) (Luminescence)

L 8848-63

BDS

ACCESSION NR: AP3000584

S/0051/63/014/005/0664/0675

AUTHOR: Kaplyanskiy, A. A.; Medvedev, V. N.; Feofilov, P. P.

54

TITLE: Spectra of trivalent cerium ions in alkaline earth fluoride crystals

SOURCE: Optika i spektroskopiya, v 14, no. 5, 1963, 664-675

TOPIC TAGS: luminescence, absorption, crystal phosphors, Ce

ABSTRACT: The absorption and luminescence spectra of cerium in Ca, Sr and Ba fluoride single crystals were obtained at 300, 77 and 4.2°K in the region corresponding to 4f-5d transitions in the trivalent Ce ion. Ce sup 3+ is of particular interest because its 4f shell contains only one electron so that the level diagram is very simple; for the free Ce sup 3+ it has only two levels, differing as regards orientation of the electron spin. At room temperature the absorption spectra were measured by means of SF-4 and UR-10 spectrophotometers; at low temperatures the spectra were recorded on a quartz optics KSA-1 spectrograph. The luminescence was excited by a PPK-2 mercury discharge tube, mostly without monochromatization. At room temperature the absorption spectra

Card

1/2

L 91118-63  
ACCESSION NR: AP3000584

0

consist of two wide bands, the separation between which decrease in going from Ca to Ba fluoride as the host. At low temperature fine structure appears. The luminescence spectrum at room temperature also consists of two wide bands, one of which overlaps with one of the absorption bands; at low temperatures structure develops in both bands and the background fades. The principal lines in the single crystal absorption and luminescence spectra at 4.2°K are tabulated. There were identified in the low temperature spectra vibrational sequences of narrow bands and lines; there is evinced mirror symmetry between the structure of the long wavelength absorption band and the two luminescence bands, which are associated with transitions from the lowest d-state to the 4f levels: sup 2F sub 5/2 (ground state) and sup 2F sub 7/2. Forbidden transitions between these levels were detected in the infrared absorption spectra. Orig. art. has: 5 figures and 4 tables.

ASSOCIATION: none

SUBMITTED: 13Sep62 DATE ACQ: 12Jun63

ENCL: 00

SUB CODE: PH NR REF SOV: 006

OTHER: 006

jw/nk

Card 2/2

L 10099-63

EWP(q)/EWT(m)/BDS AFFTC/ASD Fq-4 JD/WH/JG

ACCESSION NR: AP3002795

S/0051/63/014/006/0824/0825

AUTHOR: Bonch-Bruyevich, A. M.; Kariss, Ya. E.; Feofilov, P. P.

TITLE: Pulsations in the stimulated emission spectrum of neodymium in glass 6/

SOURCE: Optika i spektroskopiya, v. 14, no. 6, 1963, 824-825 27

TOPIC TAGS: laser emission spectrum, neodymium glass laser, stimulated emission in neodymium

ABSTRACT: The time trace of stimulated emission in neodymium glass <sup>15</sup> in various spectral regions has been studied in solid specimens of ordinary and optically homogeneous glass, as well as in glass fibers (0.1 to 1.0 mm thick) coated with nonactivated glass. Specimen dimensions varied from 60 to 70 mm in length and from 4 to 6 mm in diameter; end-mirror transparency was 4 to 6%. Measurements were conducted at room temperature and 77K. A mask with two slits in the image plane having a spectral width of about 4 Angstroms served as a basis of comparing two sections of the spectrum about 20 Angstroms apart. Oscillograms were obtained which showed unmistakably that the generation of stimulated emission does not start

Card 1/2

L 10099-63

ACQUISITION NR: AP3002795

0

simultaneously in different sections of the spectrum. A difference in pulse quantity as well as in relative distribution of pulse intensity was observed in the time trace of stimulated emission from a specimen of homogeneous glass. The same held true for a neodymium glass fiber 0.5 mm in diameter. Oscillograms from a solid specimen of inhomogeneous glass at 77K indicated a quasi-continuous generation without pulsations. The time trace was similar over different sections of the spectrum. Attenuating oscillations occurred at about 200K at the same pumping energy, but these were discernible only in the first section of the spectrum. The spectral variations observed in the process of radiation generation in the neodymium glass cannot be explained by thermal changes in the properties of the cavity. The view is advanced that they more naturally could be associated with noncritical excitation conditions in sections of the spectrum near the maximum luminescence zone. The generation wavelengths are thought to be determined mainly by accidental factors, and after an interruption the emission starts at a somewhat changed frequency. Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 07Jan63 DATE ACQ: 15Jul63

ENCL: 00

SUB CODE: 00 NO REF SOV: 001

OTHER 002

Card 2/2

AID Nr. 995-19 21 June

**LUMINESCENCE AND STIMULATED EMISSION OF NEODYMIUM-ACTIVATED GLASS (USSR)**

Feofilov, P. P., A. M. Bonch-Bruyevich, V. V. Vargin, Ya. A. Imas, G. O. Karapetyan, Ya. Ye. Kriss, and M. N. Tolstoy. IN: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 27, no. 4, Apr 1963, 466-472.

S/048/63/027/004/002/026

Studies of luminescence and induced emission of neodymium-doped glass have been carried out, and optimum glass composition was determined. Glasses were developed which are superior to those used by E. Snitzer. Absorption and luminescence spectra were obtained, and the dependence of the duration of luminescence on concentration was determined. Induced emission was observed both in glass fibers encased in glass and in highly homogeneous glass cylinders. The dependence of time characteristics and spectral composition of induced emission on pumping energy was established. The prospects of application of the material to practical lasers and to study of induced emission phenomena are discussed.

[BB]

Card 1/1

KARISS, Ya.E.; FEOFILOV, P.P.

Absorption and emission of divalent holmium and erbium ions  
in crystals of the fluorite type. Opt. i spektr. 15 no.4:572-  
574 0 '63. (MIRA 16:11)



ACCESSION NR: AP4020928

S/0051/84/016/002/0264/0273

AUTHOR: Kaplyanskiy, A.A.; Feofilov, P.P.

TITLE: Low-temperature spectra of divalent samarium in alkali halide single crystals

SOURCE: Optika i spektroskopiya, v.16, no.2, 1964, 264-273

TOPIC TAGS: alkali halide crystal, alkali halide phosphor, samarium activated crystal, samarium doped alkali halide, samarium ion absorption, samarium ion luminescence, samarium 2+, low-temperature absorption, low-temperature luminescence

ABSTRACT: There have been numerous studies of the luminescence and absorption spectra of divalent samarium ions in different crystal hosts with di- and trivalent cations. Recently (V.Ye.Karpetyan, B.I.Maksakov and P.P.Feofilov, Opt.i spektr.,14, 441,1963) there was demonstrated the possibility of activating alkali halide (MeHal) single crystals with monovalent cations with  $\text{Sm}^{2+}$  ions; some preliminary data on the Sm spectra were reported in the above mentioned paper. The present paper describes the results of further spectroscopic measurements of the luminescence and absorption of similar crystals -  $\text{MeHal:Sm}^{2+}$  (Me = Na or K; Hal = Cl, Br or I) mainly at 77 and

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ACCESSION NR: APL020928

4.2°K. The spectra were photographed by means of KSA-1 and Q-12 prism spectrographs and also by means of a DAS-1 diffraction grating instrument (dispersion 8 Å/mm), using plates sensitive to 820 mμ. The sources were incandescent lamps and a GSVD-250 discharge tube for the absorption and a superhigh pressure SVDSH-1000 mercury discharge tube with an SZS-10 light filter for the luminescence. Photometric traces of some of the absorption and emission spectra with many of the peaks and transitions identified are reproduced. Some measurements were also made of the persistence; generally, the luminescence of  $K\text{Hal:Sm}^{2+}$  crystals at 4.2°K consists of two groups of bands: narrow bands (forbidden  $4f^6$  transitions) with  $\tau \approx 10^{-2}$  sec and diffuse "background" bands with  $\tau < 10^{-5}$  sec. The experimental results are discussed and some of the distinctive features of the spectra of the investigated crystals are noted. The presence of different band groups may be explained either by the existence of centers of two types or on the assumption that at 4.2°K equilibrium in the system of excited levels is not attained within  $10^{-6}$  sec. It is noted that similar fine structure in the luminescence and absorption spectra was observed at 4.2°K for  $\text{KCl:Eu}^{2+}$  and similar crystals. The authors consider it their obligation to thank N.A. Moshkin for extensive photographing and scanning of the spectra and M.N. Tolstoy for measuring the luminescence persistences." Orig.art.has: 2 figures and 2 tables.

Card 2/3

KARAPETYAN, G. O.; KARISS, Ya. E.; LUNTER, S. G.; FEOFILOV, P. P.

3

"The effect of glass structure on trivalent neodymium luminescence."

report submitted for 4th All-Union Conf on Structure of Glass, Leningrad,  
16-21 Mar 64.

TOLSTOY, M.N.; FEOFILOV, P.P.

On the "puzzling" luminescence of thulium in fluorite. Opt. i  
spektr. 16 no.2:372-374 F '64. (MIRA 17:4)

ACCESSION NR: AP4032866

S/0051/64/016/004/0619/0627

AUTHOR: Kaplyanskiy, A.A.; Moskvina, N.A.; Feofilov, P.P.

TITLE: Investigation of the electric and magnetic series in the luminescence spectra of alkali fluorides activated by hexavalent uranium

SOURCE: Optika i spektroskopiya, v.16, no.4, 1964, 619-627

TOPIC TAGS: luminescence spectrum, polarized luminescence, luminescence center, level diagram, luminescence temperature, uranium activated lithium fluoride, uranium activated sodium fluoride, uranium  $6^+$

ABSTRACT: The present study is a continuation of investigations of the electric and magnetic series of lines and bands in the luminescence spectra of LiF and NaF crystals activated by hexavalent uranium. A number of earlier studies by the authors and other non-Soviet experimenters are referred to and discussed. The crystals were grown at the Institute of Crystallography of the Academy of Sciences SSSR. Most of the measurements were performed on NaF: $U^{6+}$  crystals, in the spectrum of which the series are more clearly pronounced, but the principal inferences apply to LiF:U crystals as well. The measurements (mostly at liquid-nitrogen temperature) in-

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ACCESSION NR: AP4032866

cluded determination of the degree of polarization  $P$  of the luminescence as a function of the wavelength of the exciting light,  $\lambda_{\text{excit}}$ . There was established qualitative mirror symmetry of the  $P$  versus  $\lambda_{\text{excit}}$  curves for the electric and the magnetic series, which is interpreted as indicating that the same or common centers are responsible for the electric and magnetic dipole series. Also studied were the intensity distributions in the electronic-vibronic series (the observed distributions agree with the predictions of theory) and the temperature dependence of the luminescence spectra of  $\text{LiF:U}$  and  $\text{NaF:U}$ . An increase in temperature in the range from liquid nitrogen to about  $350^\circ\text{K}$  results in a shift of the electric and magnetic luminescence spectra (lines) to the long wavelength side; the shifts are approximately the same for most lines, but a few lines appear to be more "temperature sensitive". The temperature shift is associated with a change in the lattice parameters with heating. Level diagrams for the luminescence centers in  $\text{LiF:U}$  and  $\text{NaF:U}$ , based on the results of the temperature variation measurements and other data, are presented. Curves are given for the temperature dependences of the intensities of the head bands of the electric and magnetic series; the intensity of the former increases with rising temperature; that of the latter falls off. A value of approximately  $10^3$  is adduced for the ratio of the probabilities for electric and magnetic transitions. Superficial similarities between the levels and transitions in the investigated crystals and in  $\text{MeF:Sm}^{2+}$  (where  $\text{Me} = \text{Sr}$  or  $\text{Ba}$ ) are noted. Orig. art. has: 6 figures, 5 formulas, and 1 table.

Card 2/3

ACCESSION NR: AP4032866

ASSOCIATION: none

SUBMITTED: 21Jun63

SUB CODE: IC, OP

ATD PRESS: 3081

NR REF SOV: 009

ENCL: 00

OTHER: 003

Card 3/3

PEOPLOV, P.P.

International Conference on Luminescence held at Torun.

Opt. i spektr. 16 no.6:1071-1073 Je '64.

(MIRA 17:9)



AP4048/42

11-123

Mariss, Ia. E.; Seofilov, D. P.

Luminescence of neodymium in lead molybdate single crystals

Opt. i Spektroskopiya, v. 17, no. 3, 1974, 14-123

ABST: neodymium, lead compound, single crystal, luminescence spectrum, level scheme, term splitting, absorption spectrum

ABST: The authors investigated the luminescence and absorption spectra of single crystals of lead molybdate ( $PbMoO_4$ ) activated with neodymium. The crystals were grown by the Czochralski method. The charge due to substitution of  $Pb^{2+}$  by  $Ne^{3+}$  was determined. The investigations were made at 300, 77, and 4.2°K. The luminescence was excited with a mercury lamp. A grating monochromator with interchangeable gratings (300 and 600 lines per mm, dispersion 40 and 20 R) was used. Some of the investigations were made in polarized light, in which case the samples were cut from the crystal parallel to the optical axis. A simultaneous study was made of the luminescence spectra and absorption

ACCESSION NR: AP4048742

2

spectra corresponding to transitions between the principal term  $4I_{5/2}$  and the other terms of the  $4I$  multiplet and the  $4F_{3/2}$  term and the results were used to establish a detailed empirical level scheme for the transitions considered for the  $Nd^{3+}$  ion in  $PMg$ . Some of the relatively weaker lines, which do not fit into this scheme, are attributed to activator centers of a different symmetry. There is a qualitative agreement between the empirical scheme and the calculation measurements. "The authors are grateful to G. I. Maksimov for growing and supplying the single crystals." The paper has 5 figures.

ASSOCIATION: none

SUBMITTED: 06Jan64

ENCL: 00

SUB CODE: OP,SS

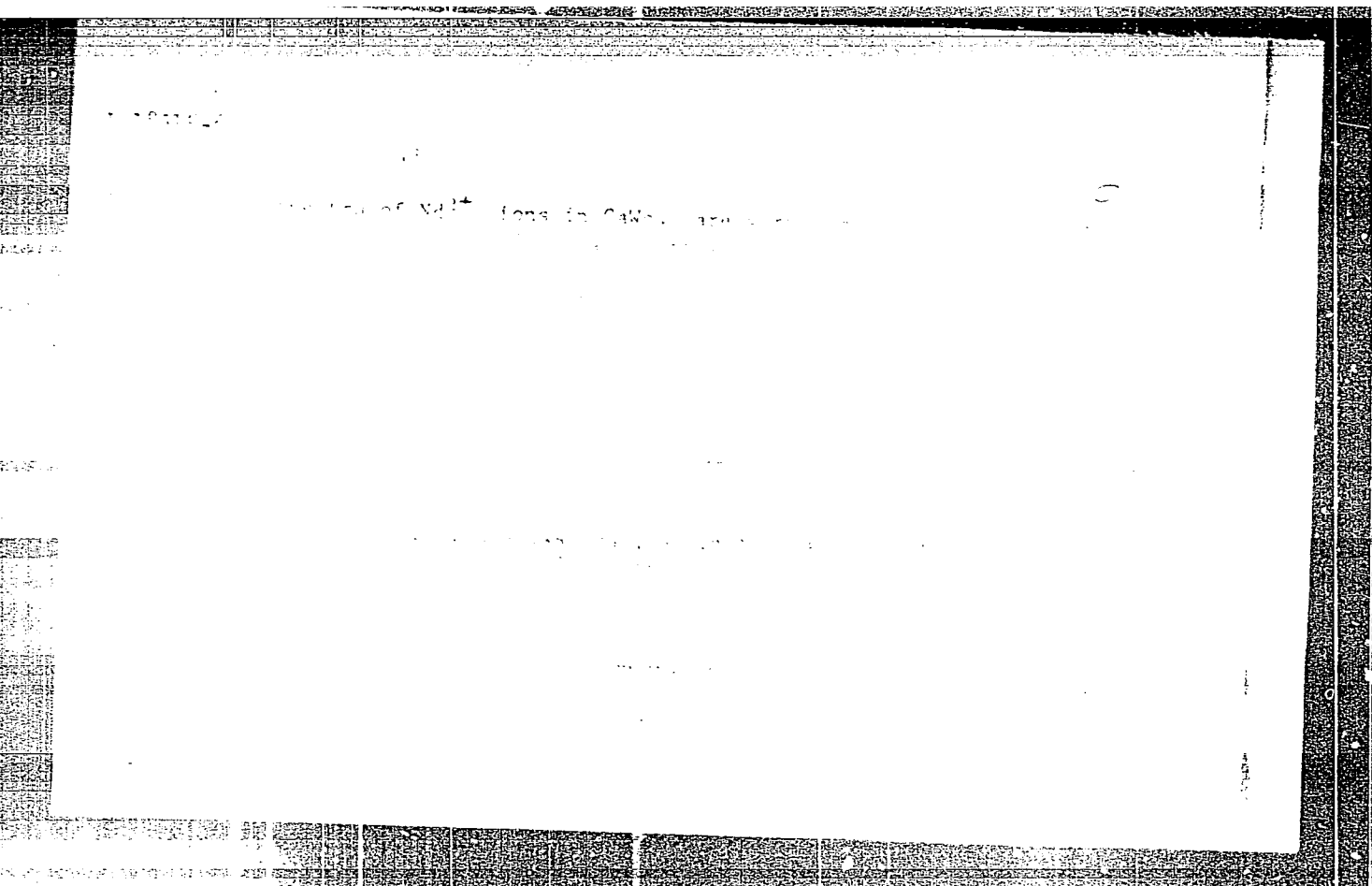
REF ID: A003

OTHER: 007

AND PRESS: 5.01

Card 2/2





L 21095-65 EWT(1)/EWP(e)/EWT(m)/EEC(b)-2 AFWL/AS(mp)-2/ESD(51)/ESD(61)

AP5001284

P/0045/64/026/030/0331/0343

Neofilov, P. P.

luminescence of tri- and divalent ions of the rare earths  
of the fluorite type

Acta physica polonica, v. 26, no. 3-4, 1964, 331-343

TOPIC TAGS: luminescence property, luminescence center, luminor,  
single crystal, alkaline earth metal, rare earth metal

ABSTRACT: This is a review article summarizing the latest research  
on the luminescence characteristics of activated single  
crystals: luminescence line spectra, particularly of the  
rare earth ions. The author discusses the properties of  
the luminescence of the rare earth ions in single crystals.  
The properties considered are the luminescence of the rare earth  
ions in single crystals.

L 21114-1

ACCESSION NR: AP5001284

... for the occurrence of luminescence centers in the crystals, the structure of the activator centers, the energy level scheme of the luminors, and the processes occurring in the excited state. The samples were single-crystal fluorides of the type  $(MeF)_2$ , where  $Me = Ca, Sr, Ba$ , which crystallize in a fluorite lattice. These fluorides contain rare-earth elements (Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu) as activators. The samples were prepared by the Czochralski method and were analyzed separately. The main distinction in the structure of the luminors of these fluorides is the probability of nonradiative transition and the lack of the energy levels of the rare-earth elements. The energy schemes of the luminors are shown in the figure. The location of the terms of the rare-earth elements is determined by the weak bond of the additional 4f-electron. This gives rise to transitions to mixed configurations in excess of those for the

Card 2/3







I 34870-65

ACCESSION NR: AP5005052

... a broad ball-shaped band with maximum near 1.2  $\mu$  ...  
 ... 2K. In addition to the unusually ...  
 ... relative to the absorption ...  
 ... anomalies suggest that ...  
 ... constituting electrons localized in defects of ...  
 ... of using F-center models to explain the ...  
 ... has 3 figures.

Time

Mar 61

003

ENCL: 00

OTHER: 012

SUB CODE: 0P

SWT(m)/LFF(n)-2/1/ENP(t)/ENP(s)

NR: APS00R047

Series, Ya. E.; Tolstoy, M. N.; Fedilov, P. V.

Stimulated emission of neodymium in single crystals

Source: Optika i spektroskopiya, v. 18, no. 1, 1965, 177-179

TOPIC TAGS: stimulated emission, neodymium, lead compound, single crystal, IR radiation, emission threshold

ABSTRACT: To explain the failure to obtain stimulated emission from  $\text{Nd}^{3+}$  in single crystals, the authors determined the dependence of the emission threshold on a function of the crystal temperature, the intensity of the excitation light, and the duration of the excitation pulse. It was found that the emission threshold was a function of the crystal temperature, the intensity of the excitation light, and the duration of the excitation pulse. The temperature dependence of the emission threshold was found to have the form shown in Fig. 1 of the Enclosure. In addition, when the crystal was excited with two succeeding pulses of equal intensity, emission occurred during the first pulse but not during the second, provided the time interval between pulses was shorter than a definite time, which increased with decreasing

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ACCESSION NR: AP5003047

temperature. The loss of generating ability could be restored by exposure to red light. The results are attributed to the absorption of light of a certain amount of shortwave radiation from which the crystal becomes capable of absorbing light of a longer wavelength in the infrared where there was no absorption before. The increase in the generating ability is due to the increase in the concentration of the active substance in the crystal.

1. Method for growing the single crystal. (Fig. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 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2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 21

NR: AP5003047

FIGURE 1

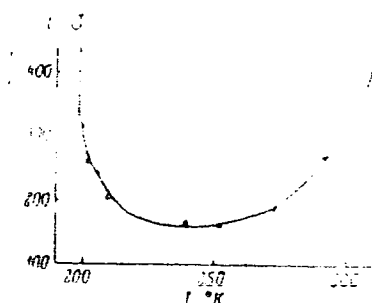


Fig. 1. Temperature dependence of the threshold of stimulated emission in a GaAs diode.

Fig. 1

... was called "additive" by analogy with the additive effect of the electric field on the luminescence of the ions. The luminescence spectra of the ions, corresponding to transitions within the states of the ionization  $10^4$ , were found to be identical with the spectra of the ions.

... 1000, and this leads to a distance of ... ..

L 62672-5

ACCESSION NR: AP5017345

... stated that the additional absorption of the relatively small crystals ...  
... the absorption of "holes" content which is considerably ac-

L 34938-65 EWT(1)/EWT(m)/EWP(e)/T/EWP(t)/EWP(b)/EMA(c) IJP(c) JD/JW/WH

ACCESSION NR: AF504430

S/0051/65/018/003/0440/0445

AUTHOR: Kariss, Ya. E.; Tolstoy, M. R.; Feofilov, P. P.

36  
8

TITLE: Luminescence and absorption of trivalent neodymium in fluorite-type crystals

21

SOURCE: Optika i spektroskopiya, v. 18, no. 3, 1965, 440-445

TOPIC TAGS: neodymium ion, <sup>15</sup>fluorite, absorption spectrum, luminescence spectrum, calcium compound, <sup>27</sup>barium compound, <sup>27</sup>strontium compound, single crystal

ABSTRACT: The authors investigated in detail the luminescence spectra of single-crystal  $\text{CaF}_2\text{-Nd}$ ,  $\text{SrF}_2\text{-Nd}$ , and  $\text{BaF}_2\text{-Nd}$  in the regions of all the  $4f-5d$  transitions (0.4, 0.7, and 1.8  $\mu$ ), in contrast with earlier investigations. The spectra were measured in the line groups near 0.7 and 1.8  $\mu$ . The tests were carried out at 200 K and 4.2 K. The test procedure was the same as in earlier investigations. In addition to photoluminescence spectra, the authors also measured the absorption spectra. V. 17, 714 and 720, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 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3787, 3788, 3789, 3790, 3791, 3792, 3793, 3794, 3795, 3796, 3797, 3798, 3799, 3800, 3801, 3802, 3803, 3804, 3805, 3806, 3807, 3808, 3809, 3810, 3811, 3812, 3813, 3814, 3815, 3816, 3817, 3818, 3819, 3820, 3821, 3822, 3823, 3824, 3825, 3826, 3827, 3828, 3829, 3830, 3831, 3832, 3833, 3834, 3835, 3836, 3837, 3838, 3839, 3840, 3841, 3842, 3843, 3844, 3845, 3846, 3847, 3848, 3849, 3850, 3851, 3852, 3853, 3854, 3855, 3856, 3857, 3858, 3859, 3860, 3861, 3862, 3863, 3864, 3865, 3866, 3867, 3868, 3869, 3870, 3871, 3872, 3873, 3874, 3875, 3876, 3877,

CLASS ON NR: AP5006430

Luminescence spectra were obtained in the case of  $\text{CaF}_2$  for the two main types of crystals that can be grown. Empirical schemes were constructed for the line positions in the lowest terms of the  $4f^3$  configuration.

Lifetime in  $\text{CaF}_2$  was found to be  $2.5$  and  $1.1 \times 10^{-3}$  sec for centers of type I and II, respectively. The  $\text{BaF}_2$ -Nd crystals showed an entirely different spectrum, with several lines and a strong background. The  $\text{SrF}_2$ -Nd crystals had spectra similar to those obtained with fluorite type II. The differences between the spectra and those obtained by E. Kiss (J. Chem. Phys. 1957, 26, 1021) are discussed. The art. has: 9 figures.

ASSOCIATION: none

SUBMITTED: 31Mar64

ANCL: 00

SUB CODE: S,OP

NO REF SOV: 006

OTHER: 005

ATD PRESS: 3214

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... papers on the spectroscopy of activated crystals

... spektroskopiya, v. 12, no. 4, 1975, 10-

... crystal, spectroscopy, ion, rare earth metal, JPR spectroscopy,  
conference

... dealing with the spectroscopy of ...

... ..

... .. 200 participants heard 12 reports. The

largest number of papers (about 30) dealt with the spectroscopy of ions of  
the rare earth elements. P. P. Feofilov delivered a review of research

Particular attention was focused on the structure of

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16

papers dealt with the luminescence of organic compounds.

S. A. Aitshuler presented a review of the applications of EPR spectroscopy in investigating impurity ions in crystals at a special meeting devoted to the effects of external fields on the spectra of crystals. Several original papers demonstrated the uses of magnetic fields in research in solving problems of the structure of crystals and the properties of the impurity ions. One of these papers was devoted to the experimental research on the structure of crystals.

Some of the papers dealt with the properties of various systems containing ions of chromium in crystals.

Some papers were included in the theoretical papers. K. K. Rebane discussed the theory of vibrational structure spectra of impurity crystals, and V. I. Cherepanova et al reviewed methods of calculating spectra of ions with unfilled d-shells in crystals.

Card 2/1

1 17879-66 EWT(1)/EWT(m)/EWP(e)/EWP(t) LJP(c) JD/JW/WH

ACC NR: AP5027676

SOURCE CODE: UR/0051/65/019/005/0812/0814

AUTHOR: Tolstoy, M. N.; Feofilov, P. P.

ORG: none

TITLE: Removal of the degeneration of energy levels of cubic activation centers in mixed crystals of the fluorite type

SOURCE: Optika i spektroskopiya, v. 19, no. 5, 1965, 812-814

TOPIC TAGS: mixed crystals, fluorite, IR spectrum, luminescence spectrum, rare earth metal, single crystal, spectral line, line width, line splitting

ABSTRACT: According to the literature (D. S. McClure, Z. Kiss, J. Chem. Phys., 39, 3251, 1963; P. P. Feofilov, Electron. Quant., C. R. 3<sup>e</sup> Conf. internat., Paris. - N. Y. 1964, p. 1079; Acta phys. polon., 26, 331 1964), the degeneration of the energy level, which usually decreases in the fields of a lower symmetry, is partially retained in crystals of the fluorite type because of a high symmetry of the intercrystalline field ( $O_h$ ) surrounding the bivalent ions of an activator (rare earth elements) isomorphically intruding into the fluoride-type crystals.

Card 1/3

UDC: 535.372:548.0

L 17879-66

ADD NR: AF5027676

21, 44, 55

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A study was made of the infrared luminescence spectra of single crystals in the system  $\text{Ca}_{1-x}\text{Sr}_x\text{F}_2$  ( $x=0, 0.1, 0.25, 0.5, 0.75, 0.9, \text{ and } 1.0$ ) activated by 0.1 mole%  $\text{Dy}^{++}$ ,  $\text{Tu}^{++}$ , and  $\text{Ho}^{++}$ . Measurements were made at 77K. The simplest changes of the spectrum (with changed composition) were observed in crystals activated by  $\text{Dy}^{++}$ , where the widened lines were monotonically displaced from one extreme position to another. At  $x=0.5$  the lines widened to a degree that the adjacent lines could not be resolved. The absence of sharp changes was attributed to the absence of degeneration related to the presence of an inversion center. The spectra of the crystals activated by  $\text{Tu}^{++}$  and  $\text{Ho}^{++}$  were more complex. Two intensive lines, having  $\lambda=1.116$  and  $1.189\mu$  ( $\text{CaF}_2$ ) which corresponded to the Stark components of the terms  $^2F_{5/2}$  were observed in single-component crystals activated by  $\text{Tu}^{++}$ . In mixed crystals the first line monotonically displaced (with changes in  $x$ ), whereas the second line was split in two with the maximum degree of splitting ( $\sim 50\text{cm}^{-1}$ ) at  $x=0.5$ . The splitting of lines reflected the twofold degeneration of the energy level which can be removed at the expense of a relatively small distortion of symmetry caused by replacements in the cation coordination sphere. The duration of the luminescence of  $\text{Tu}^{++}$  was the same ( $\sim 7 \text{ n sec}$ ) in the single and mixed crystals. This indicated the magnetic-dipole character of the luminescence of  $\text{Tu}^{++}$ . The emission spectrum of  $\text{Ho}^{++}$  in single

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